WHAT IS CLAIMED IS:

1. A multihop network (100, 400) comprising:

a source node (102a, A); and

a destination node (102m, E), characterized by implementing a reactive routing protocol wherein a resource of the multihop network is continuously adapted in response to a topology change in the multihop network so as to optimize the performance of a connection (106) between said source node and said destination node.

2. The multihop network of Claim 1, wherein said resource includes one or more of the following:

a route (108);

a channel; or

physical layer parameters.

3. The multihop network of Claim 1, wherein said topology change includes one or more of the following:

movement of a node;

quality variations in a channel between said source node and said destination node;

changes in traffic patterns in the multihop network;

changes in transmit patterns in the multihop network; or

changes in resource allocations in the multihop network.

4. The multihop network of Claim 1, wherein said resource is adapted in an opportunistic manner in response to an instantaneous topology change in the multihop network.

5. The multihop network of Claim 1, wherein said resource is adapted in a distributed manner where at least one neighboring node (F, G) is inserted into the connection between said source node and said destination node and where at least one active node (C, D) is removed from the connection between said source node and said destination node.

6. The multihop network of Claim 1, wherein said resource is adapted in a distributed manner where at least one active node (C, D) is removed from the connection between said source node and said destination node.

7. The multihop network of Claim 1, wherein said resource is adapted in a distributed manner to satisfy one or more of the following conditions:

meet a carrier to interference ratio;

ensure existing connections meet their carrier to interference ratios;

minimize aggregate power in the multihop network; and

uses lowest cost to connect said source node and said destination node.

8. A method (200) for optimizing the performance of a connection (106) between a source node (102a, A) and a destination node (102m, E) in a multihop network (100, 400), said method characterized by the steps of:

transmitting (202) a beacon (302) containing a measure of performance for the connection (106) from at least one active node (102f, 102h, 102k, 102l, B, C and D) associated with the connection between the source node and the destination node;

receiving (204) at least one of the transmitted beacons at at least one neighboring node (102b, 102d, 102e, 102g, 102i, 102j, 102p, 102o, F and G) associated with the connection between the source node and the destination node;

calculating (206) at each neighboring node a cost function based on the measure of performance in each received beacon;

determining (208) at each neighboring node whether the cost function for the connection between the source node and the destination node can be improved by adapting at least one resource in the multihop network; and

if yes, adapting (210) the at least one resource to improve the cost function for the connection between the source node and the destination node; or

if no, maintaining (212) the at least one resource in the connection between the source node and the destination node.

9. The method of Claim 8, wherein each active node is capable of performing the receiving step, the calculating step, the determining step, the adapting step and the maintaining step.

10. The method of Claim 9, wherein said at least one resource which is adapted during said adapting step includes:

a route (108);

a channel; or

physical layer parameters.

11. The method of Claim 9, wherein said adapting step includes inserting at least one of the neighboring nodes into the connection between the source node and the destination node and removing at least one of the active nodes from the connection between the source node and the destination node.

12. The method of Claim 9, wherein said adapting step includes removing at least one of the active nodes from the connection between the source node and the destination node.

13. The method of Claim 8, wherein said adapting step is performed when there is a topology change in the multihop network, said topology change includes:

movement of a node;

quality variations in a channel between the source node and the destination node;

changes in traffic patterns in the multihop network;

changes in transmit patterns in the multihop network; or

changes in resource allocations in the multihop network.

14. The method of Claim 8, wherein said at least one resource of the multihop network is adapted in an opportunistic manner in response to an instantaneous topology change in the multihop network.

15. The method of Claim 8, wherein each beacon includes a general broadcast part (312) and a connection related part (314) that contains the measure of performance which includes one or more of the following:

accumulated cost for the connection between the source node and the destination node; or

maximum allowed power for the transmitting active node.

16. A wireless multihop network (100, 400) that implements a reactive routing protocol to optimize the performance of a connection (106) between a source node (102a, A) and a destination node (102m, E), said wireless multihop network characterized by:

at least one active node (102f, 102h, 102k, 102l, B, C and D) located in the connection between the source node and the destination node, wherein each active node is capable of:

transmitting (202) a beacon (302) containing a measure of performance for the connection between the source node and the destination node;

at least one neighboring node (102b, 102d, 102e, 102g, 102i, 102j, 102p, 102o, F and G) associated with the connection between the source node and the destination node, wherein each neighboring node is capable of:

receiving (204) at least one of the transmitted beacons;

calculating (206) a cost function based on the measure of performance in each received beacon;

adapting (210) at least one resource in the wireless multihop network if it is possible to improve the cost function for the connection between the source node and the destination node.

17. The wireless multihop network of Claim 16, wherein each active node is capable of performing the receiving step, the calculating step and the adapting step.

18. The wireless multihop network of Claim 17, wherein each neighboring node performs the adapting step by reallocating the at least one resource which includes:

a route (108);

a channel; or

physical layer parameters.

19. The wireless multihop network of Claim 17, wherein said adapting step includes inserting at least one of the neighboring nodes into the connection between the source node and the destination node and removing at least one of the active nodes from the connection between the source node and the destination node.

20. The wireless multihop network of Claim 17, wherein said adapting step includes removing at least one of the active nodes from the connection between the source node and the destination node.

21. The wireless multihop network of Claim 16, wherein each neighboring node performs the adapting step when there is a topology change in the wireless multihop network, said topology change includes:

movement of a node;

quality variations in a channel between said source node and said destination node;

changes in traffic patterns in the wireless multihop network;

changes in transmit patterns in the wireless multihop network; or

changes in resource allocations in the multihop network.

22. The wireless multihop network of Claim 16, wherein each neighboring node performs the adapting step in an opportunistic manner in response to a real-time topology change in the wireless multihop network.

23. The wireless multihop network of Claim 16, wherein each beacon includes a general broadcast part and a connection related part that contains the measure of performance which includes one or more of the following:

accumulated cost for the connection between the source node and the destination node; or

maximum allowed power for transmitting active node.

24. A node (102a-102q and A-G) within a wireless multihop network (100, 400) that implements a reactive routing protocol (200) to optimize the performance of a connection (106) between a source node (102a, A) and a destination node (102m, E), said node can be either an active node (102f, 102h, 102k, 102l, B, C and D) or a

neighboring node (102b, 102d, 102e, 102g, 102i, 102j, 102p, 102o, F and G) where:

said active node is located in the connection between the source node and the destination node, wherein said active node is capable of:

transmitting (202) a beacon (302) containing a measure of performance for the connection between the source node and the destination node;

said neighboring node is associated with the connection between the source node and the destination node, wherein said neighboring node is capable of:

receiving (204) at least one of the transmitted beacons;

calculating (206) a cost function based on the measure of performance in each received beacon;

adapting (210) at least one resource in the wireless multihop network if it is possible to improve the cost function for the connection between the source node and the destination node.